UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,373	10/10/2002	Mark A. Lillis	PES-0075	1008

23462 7590 05/18/2006

CANTOR COLBURN, LLP - PROTON
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER	
RUTHKOSKY, MARK	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/065,373	Applicant(s) LILLIS, MARK A.	
	Examiner Mark Ruthkosky	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-16 and 21-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-16 and 21-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 11-16 and 21-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews et al. (US 6,036,827) in view of Ono et al. (JP 401066537 A), as evidenced by Bhandari et al. (US 6,006,582.)

The instant claims are to a process for operating an electrochemical system, comprising calibrating a hydrogen gas detector by passing a hydrogen-free gas through a first conduit to the hydrogen detector, wherein the hydrogen gas detector generates a first signal; flowing a known quantity of hydrogen gas from a hydrogen/water separator through a second conduit to the hydrogen gas detector, wherein the hydrogen gas detector generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and calibrating the hydrogen gas detector based upon the first and second signals; introducing water to an electrolysis cell; producing hydrogen; separating hydrogen from water in the hydrogen/water separator; introducing environmental gas disposed around electrochemical system components to the hydrogen gas detector; and determining the hydrogen concentration in the environmental gas.

Andrews et al. (US 6,036,827) teaches a process for operating an electrochemical system by introducing water to an electrolysis cell; producing hydrogen; separating hydrogen from water

in a hydrogen/water separator; introducing environmental gas disposed around electrochemical system components to a hydrogen gas detector; and determining the hydrogen concentration in the environmental gas (see col. 7, line 30 to col. 8, line 50 and col. 21, line 50 to col. 22, line 10.) The reference will inherently pass gasses through a conduit to the hydrogen detector. The reference teaches that if the detection of hydrogen is at a high concentration the hydrogen source would be shut down and the hydrogen and the carrier gas would dissipate into the atmosphere (col. 34, lines 1-11; col. 21, line 60 to col. 22, line 15.)

The reference does not teach calibrating a hydrogen gas detector by passing a hydrogen-free gas through a first conduit to the hydrogen detector, wherein the hydrogen gas detector generates a first signal; flowing a known quantity of hydrogen gas from a hydrogen/water separator through a second conduit to the hydrogen gas detector, wherein the hydrogen gas detector generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and calibrating the hydrogen gas detector based upon the first and second signals.

The calibration of a measuring device, such as a detector, is well known in the art for providing an accurate reading by the device. For example, Ono et al. (JP 401066537 A) teaches a method of detecting hydrogen gas in a detector including the step of calibrating a hydrogen gas detector by passing a hydrogen-containing gas into hydrogen detector, wherein the hydrogen gas detector generates a first signal to determine a correlation between the concentration of hydrogen and an output signal of the hydrogen gas detector. This is followed by flowing an unknown concentration of hydrogen in a non-hydrogen gas through a second conduit (figure 1) to the hydrogen gas detector, wherein the hydrogen gas detector generates a second signal corresponding to a percentage of the hydrogen gas in the mixture. The concentration of hydrogen

is calculated by a calibration curve formula derived from known concentrations of hydrogen compared with the output signal of the hydrogen gas detector. The reference does not disclose the method at applied temperatures or pressures thus, the system is considered to be at ambient values. The calibrating system includes a sample gas injector, an air pump, a reference hydrogen-measuring device, a hydrogen gas detector, a measuring cell to give a known quantity of gas for measuring, various conduits and interfaces, and a data processor (figure 1.)

It would be obvious to one of ordinary skill in the art at the time the invention was made to calibrate a detector using known concentration standards in order to determine that a signal produced by the detector is accurate for the known standard. The detector may be adjusted to give the proper signal if necessary. This is well known for devices such as detectors, scales, sensors and the like. It would be obvious to one of ordinary skill in the art at the time the invention was made to calibrate the hydrogen gas detector taught by Andrews et al. (US 6,036,827) using the method of calibrating the detector by comparing adjusted output signals based on the known concentration of hydrogen, as taught by Ono et al. (JP 401066537 A), in order to accurately detect the hydrogen concentration in an environmental gas as desired by Andrews. Further, it would be obvious to use various *known* concentrations of hydrogen in order to develop the calibration curve as disclosed in Ono. Introducing a hydrogen-free gas provides a low-end signal value for calibration. Using air as the hydrogen free gas would be obvious to the skilled artesian as the baseline value as hydrogen is generally not a component of air.

Bhandari et al. (US 6,006,582) teaches hydrogen sensors used for detecting hydrogen concentrations in devices. The reference discloses that hydrogen sensors require calibration including clean air calibration in order to determine the proper detection based on the materials

of the sensor (col. 1, line 64 to col. 2, line18.) Measuring a larger number of known concentration points in the calibration of a detector will give a more accurate calibration of the detector over a broader range of concentrations.

The references do not teach flowing a known quantity of hydrogen gas from a hydrogen/water separator through a second conduit to the hydrogen gas detector; however, Ono teaches that the calibration system for the detector includes a measuring cell. One of ordinary skill in the art would recognize that a source of hydrogen gas is available from the hydrogen generating system taught in Andrews et al. (US 6,036,827) where hydrogen is collected with a hydrogen/water separator and that the quantity of sample gas would be determined in the measuring device taught in the Ono system in order to provide a known quantity of hydrogen to calibrate the system as taught by Ono. The Ono reference teaches using a gas metering device and a measuring cell to measure the amount of hydrogen from the gas injector (figure 1.)

With regard to claim 13, the background section of the instant specification teaches that coupling hydrogen producing electrolysis cells with fuel cells is well known in the prior art, forming regenerative fuel cells. The background further notes that calibrated hydrogen gas detectors for these systems are also well described. It would be obvious to one of ordinary skill in the art at the time the invention was made to couple the hydrogen and oxygen of the electrolyzer to a fuel cell in order to generate electricity as the coupling of the hydrogen source to a fuel cell is well known in the art to fuel a fuel cell and generate electricity.

With regard to claims 25-27 and 31-32, it would be obvious to one of ordinary skill in the art to recalibrate the hydrogen detector of Andrews in order to provide an accurate reading of the amount of hydrogen in a sample gas. Recalibrating would be obvious to the skilled artesian to

reduce the possibility of error in the event that the detector drifts from its proper output. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

With regard to claims 30-32, Ono teaches calibrating a hydrogen gas detector by passing an air pump sample gas through a first conduit to the hydrogen detector, wherein the hydrogen gas detector measures a first value; flowing a known quantity of a reference hydrogen gas to the hydrogen gas detector, wherein the hydrogen gas detector measures a second value corresponding to a percentage of the hydrogen gas in the mixture, determining the correlationship of the first and second signals, and calibrating the hydrogen gas detector. The detector of Ono is in fluid communication with the system as the sample gas is carried through the detector to determine the concentration of hydrogen in the sample gas. Both Ono and Andrews teach data storage in a processor. Based on the teachings of Andrews and Ono, it would be obvious to combine the elements taught in the reference to include a calibrated detector fluidly connected to the hydrogen source of the invention of Andrews in order to give an accurate measurement of concentration of hydrogen in the sample gas. As the Ono reference gives motivation to provide the structure for introducing gasses from the system to the detector, merely automating the calibration would be obvious over the teachings of the prior art, (See MPEP 2144.04 sections titled "Automating a manual activity" and "Making Integral.") For these reasons, the claims stand rejected.

Response to Arguments

Applicant's arguments filed 3/2/2006 have been fully considered but they are not persuasive.

The applicant summarizes the rejection and then argues that the Andrews reference cited in the rejection does not teach that the hydrogen detector is calibrated or in fluid communication with the system and that there is no motivation to modify the apparatus of Andrews to allow for gas flow from the hydrogen/water separator to calibrate the detector. This argument is not persuasive. The Ono publication is provided as support that it would be obvious to modify the invention of Andrews to obtain applicant's claimed invention. Ono teaches calibrating a hydrogen gas detector by passing an air pump sample gas through a first conduit to the hydrogen detector, wherein the hydrogen gas detector measures a first value; flowing a known quantity of a reference hydrogen gas to the hydrogen gas detector, wherein the hydrogen gas detector measures a second value corresponding to a percentage of the hydrogen gas in the mixture; determining the correlationship of the first and second signals, and calibrating the hydrogen gas detector. Ono does not teach that the hydrogen is introduced from a hydrogen/water separator; however, it does teach that the gas is dehumidified in order to measure the concentration of gas. As the water separator is a means known in the art for dehumidifying a gas, the skilled artesian would find passing the gas through a hydrogen/water separator obvious based on the teaching of Ono. Further, the detector of Ono is in fluid communication with the system as the sample gas is carried through the detector to determine the concentration of hydrogen in the sample gas. Both Ono and Andrews teach data storage in a processor. Based on the teachings of Andrews and Ono, it would be obvious to combine the elements taught in the reference to include a calibrated

detector in the invention of Andrews in order to give an accurate measurement of concentration of hydrogen in the sample gas. It is noted that claims 21-27 do not require the gas is flowed from a hydrogen/water separator.

With regard to the applicant's arguments that there is no motivation to combine the teachings of Ono with the Andrews reference, this is not persuasive, as the skilled artesian would understand that the calibration of detectors is proper to ensure that the measured readings are accurate. This is standard practice in the art of measuring and is noted in Ono for giving a correlation between the hydrogen concentration and the signal of a detector.

The applicant admits in the background section of the specification that manual calibration of detectors in electrochemical systems has been done in the past, but there is no teaching of operating an electrochemical system as claimed. It is noted that the instant claims do not preclude manual calibration of the detector when coupled with the electrolyzer taught in Andrews. Applicant argues that the newly added claims allow for the automatic calibration and periodic calibration of the electrochemical system. Based on the teachings of Andrews and Ono, it would be obvious to combine the elements taught in the reference to include a calibrated detector fluidly connected to the hydrogen source of the invention of Andrews in order to give an accurate measurement of concentration of hydrogen in the sample gas. As the Ono reference gives motivation to provide the structure for introducing gasses from the system to the detector, merely automating the calibration would be obvious over the teachings of the prior art. MPEP 2144.04 sections titled "Automating a manual activity" and "Making Integral" state that broadly providing an automatic or mechanical means to replace and manual activity, which accomplished the same result, in this case calibrating, is not sufficient to distinguish over the prior art.

For these reasons, the claims are rejected as being obvious over the prior art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

5-8-2006

Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745